Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 205 (2015) 287 – 291

Procedia
Social and Behavioral Sciences

6th World conference on Psychology Counseling and Guidance, 14 - 16 May 2015

First Evidence on the Validity of the Students' Relatedness Scale (SRS) and of the School Well-being Scale (SWS)

Fabio Alivernini[a]*, Sara Manganelli[a]

[a]*National Institute for the Educational Evaluation of Instruction and Training (INVALSI), Via Borromini, 5 – 00044 Frascati (RM), Italy*

Abstract

Several studies suggest that students' relatedness and well-being are related to students' success at school and healthy development. The purpose of this study is to examine psychometric properties and construct validity of the Students' Relatedness Scale (SRS) and of the School Well-being Scale (SWS). Multi-group confirmatory factor analyses (MCFA) are performed to test the theoretical structure of the two scales and their metric invariance across gender. Results of MCFAs are consistent with the scale structure hypothesized for SRS and SWS, and show the scales' measurement invariance across gender. The internal consistency of the scales ranged from .72 to .85.

Peer-review under responsibility of Academic World Research and Education Center.

Keywords: Confirmatory Factor Analyisis; Students'Relatedness Scale; School Well-being Scale; Validity.

1. Introduction

There is extensive agreement on the fact that the goals of education need to be reframed to prioritize not only academic learning, but also social and emotional competencies (Cohen, 2006). Accumulating empirical evidence suggests that social-emotional skills, knowledge, and dispositions provide the foundation for participation in a democracy and improved quality of life (Cohen, 2006). The present study focuses on two socio-emotional elements: students' relatedness and school well-being.

According to the Self-Determination Theory, relatedness is an innate psychological need and can be defined as the desire to feel connected to valued others (Deci & Reci, 2002). Students experience relatedness when they feel connected to their classmates and they perceive to be listened to and cared about by their classmates. Many studies

* Fabio Alivernini. Tel.: +390694185345; fax.
E-mail address: fabio.alivernini@invalsi.it

Peer-review under responsibility of Academic World Research and Education Center.
doi:10.1016/j.sbspro.2015.09.079

show that these supportive relationships with classmates are positively related to students' self-regulation for learning, active participation in the life of the classroom, academic performance, and attainment of intrinsic aspirations (e.g., Anderman & Anderman, 1999; Niemec & Ryan, 2009; Niemec, Ryan, & Deci, 2009).

School well-being refers to students' levels of positive affect when they are at school, that is the frequency with which students experience positive emotions, feelings and sensations (Diener, Lucas, & Osihi, 2005; Orkibi, Ronen, & Assoulin, 2013). Learning is facilitated by positive emotions, moods, and feelings (e.g., Boekaerts, 1993) and several studies suggest that well-being is related to better coping ability and resilience in the face of adversity, better mental and physical health, satisfying interpersonal relationships, and academic success (e.g., Orkibi et al., 2013). For these reasons, over the last decade, schools have increasingly been the target of strategies and interventions designed to improve students' well-being (e.g., MIUR, 2007; WHO, 2013).

Since research literature almost unanimously considers students' relatedness and school well-being as core elements for promoting children's school success and healthy development, instruments that can adequately measure these elements are needed for obtaining indications for the development of policies and activities aiming to promote them. Nevertheless there is still a lack of instruments with sound psychometric properties measuring these two constructs.

1.1. Purpose of the study

The aim of the present study is to examine the factor structure, the measurement invariance and the reliability of the Students' Relatedness Scale (SRS) and of the School Well-being Scale (SWS).

2. Method

2.1. Participants and procedure

The data analyzed in the present study came from 1065 Italian fourth grade students who attended 10 Primary schools. The average age of the students was 9.89 years (SD = 0.35) and 50% of the students were male. Each participating school gave its informed consent. Scales were administered collectively in classroom during the first part of an ordinary school day.

2.2. Instrumentation

The SRS was composed of two subscales. Each subscale was composed of five items which asked students to estimate with how many of their classmates they have the relationship described in the item, using a five point Likert scale (where 1 corresponded to "*nobody*" and 5 corresponded to "*everybody or almost everybody*"). The Relatedness Inside the Classroom subscale assessed students' connections to their classmates when they are in school (e.g., "*How many of your classmates speak with you?*"). The Relatedness Outside the Classroom subscale assessed students' connections to their classmates when they are outside the school (e.g., "*How many of your classmates go out with you to have fun?*").

The SWS was composed of six items which asked students to rate the frequency with which they experienced at school the positive feeling, emotion or sensation described in the item, using a five point Likert scale (where 1 corresponded to "*never*" and 5 corresponded to "*very often*"). Examples of item from the SWS include: "*I felt happy*"; "*I felt relaxed*".

2.3. Data analysis

A confirmatory factor analysis (CFA) was performed separately on each of the two scales using Mplus 7 (Muthen & Muthen, 2012). In accordance with the theoretical structures of the scales, the tested model for the SRS consisted of two correlated factors, while the tested model for the SWS consisted of a single latent factor. In both scales, measurement invariance was tested across gender in terms of metric invariance by means of Multigroup CFA (MCFA). The model in which cross-group equality constraints were imposed on the estimates of factor loadings,

was compared with the model in which the pattern of the factor loadings was constrained to be the same across groups, but different estimates were allowed for the corresponding parameters (e.g., Vandenberg & Lance, 2000). Following the recommendations by Cheung and Rensvold (2002), the fit of the nested models was compared using two tests: the chi-squared difference test and the change in CFI values (cut-off value: $\Delta CFI \leqslant .01$). The criterion of change in the CFI is particularly important in our analysis since the performance of chi-squared difference test is affected by large sample size (Hu & Bentler, 1995). The modification indices provided by Mplus were used to evaluate which equality constraints contributed the most to degradation in the fit of the model (Byrne, 2012).

3. Results

The results of the CFAs are presented in Figure 2, which shows the fit indices and the standardized parameter estimates for the measurement model for the SRS (on the left) and for the SWS (on the right).

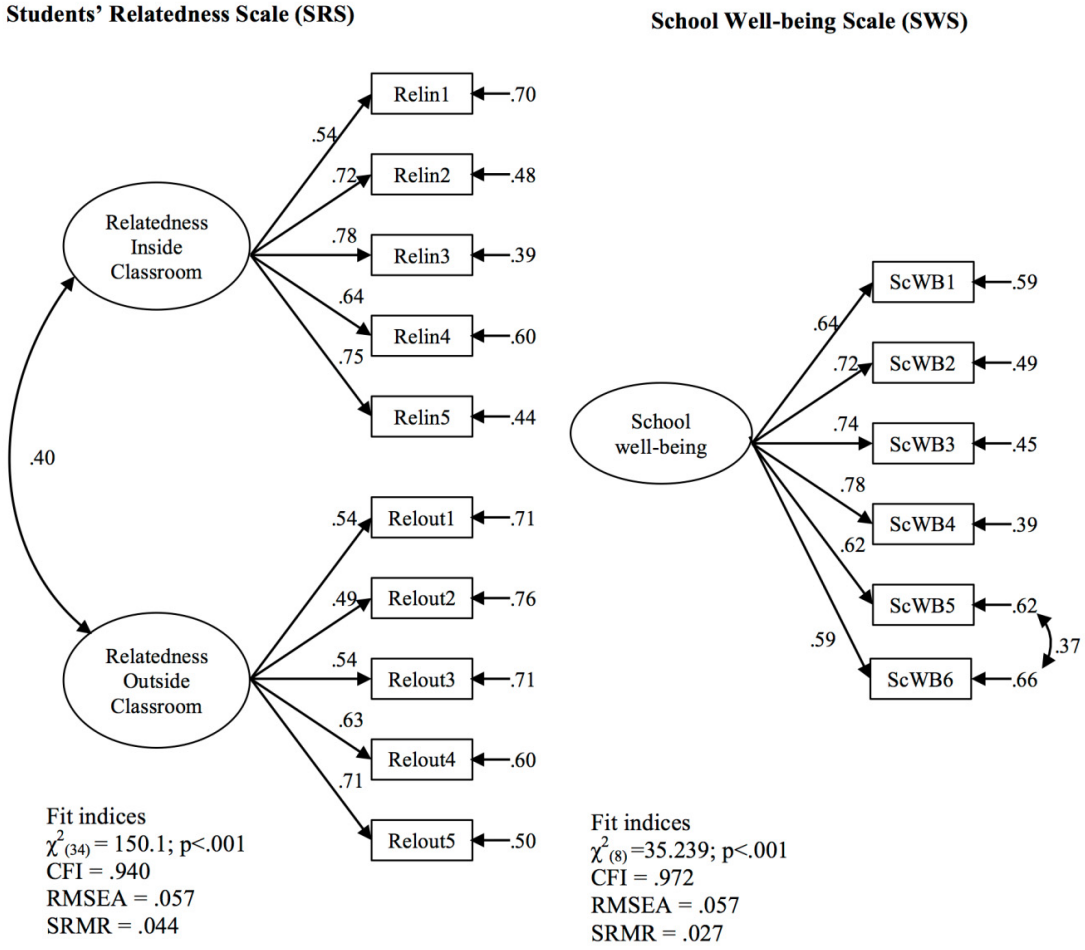

Fig. 1. Confirmatory Factor Analysis results for the measurement model of Students' Relatedness Scale (on the left) and School Well-being Scale (on the right). All the parameters represented are standardized and statistically significant ($p < .001$).

Except for the chi-squared test (probably affected by the large size of the sample used in the present study) all the fit indices indicated a high degree of correspondence (Hu and Bentler, 1999; Schreiber et al., 2006) between the

model and the empirical data in both SRS and SWS. In the SRS all but one of the factor loadings were above .50, and 60% of the loadings were above .60 (see Figure 1). As expected, the two latent factors of the SRS were positively correlated ($p < .001$). In the SWS all but one of the factor loadings were above .60 (see Figure 1). The correlation between the residuals of items ScWB5 and ScWB6 significantly improved the fit of the model and was thus retained, also because it can be justified by the fact that these were the only two items that referred to physical well-being.

The reliability of the scales in terms of internal consistency was: .82 for Relatedness Inside the Classroom subscale, .71 for Relatedness Inside the Classroom subscale, and .86 for the School Well-being Scale.

Table 1 and 2 summarize the results of the MCFA with the fit statistics for the different types of hypotheses about measurement invariance across gender for the measurement model of the SRS and SWS.

Table 1. Summary of fit statistics for testing measurement invariance across gender of the SRS

Invariance hypothesis	χ^2	df	CFI	RMSEA	SRMR	Model comparison	$\Delta\chi^2$	Δdf	ΔCFI
1-Configural invariance[1]	1705.071*	68	.943	.055	.047	-	-	-	
2-Metric invariance[2]	201.152*	78	.934	.055	.069	2 vs 1	26.081*	10	.009

Note: [1]The pattern of the loadings was constrained to be the same across groups, but no equality constraints were imposed on the corresponding parameters; [2] Cross-group equality constraints were imposed on the estimates of all the factor loadings. * p<.001.

As regards the SRS (see Table1), the chi-squared difference test was significant (probably due to the large sample size), but the difference in CFI was smaller than the cut-off criterion of .01. Thus, we concluded that the hypothesis of metric invariance across gender could be retained.

Table 2. Summary of fit statistics for testing measurement invariance across gender of the SWS

Invariance hypothesis	χ^2	df	CFI	RMSEA	SRMR	Model comparison	$\Delta\chi^2$	Δdf	ΔCFI
1-Configural invariance[1]	34.284*	16	.982	.047	.032	-	-	-	
2-Metric invariance[2]	65.848*	22	.956	.062	.083	2 vs 1	31.564*	6	.026
3-Partial metric invariance[3]	40.254	20	.980	.044	.041	3 vs 1	5.970^{ns}	4	.002

Note: [1]The pattern of the loadings was constrained to be the same across groups, but no equality constraints were imposed on the corresponding parameters; [2] Cross-group equality constraints were imposed on the estimates of all the factor loadings; [3] Cross-group equality constraints were released for the items ScWB1 and ScWB2. [ns] not statistically significant. * p<.001.

As regards the SWS (see Table 2), the chi-squared difference test was significant and there was also a difference in the CFI values greater than the cut-off criterion (ΔCFI = 0.026). Inspection of the modification indices indicated that the fit could be improved by releasing the equality constraint for the factor loadings of items ScWB1 and ScWB2. On the basis of these results, the hypothesis of partial metric invariance (e.g., Byrne, Shavelson, & Muthen, 1989) was tested. The results showed (Table 2) that the difference in the chi-squared test was not statistically significant and ΔCFI was .002, indicating that the hypothesis of partial metric invariance could be retained.

4. Discussion

The main goals for this study were to examine the factorial structure, reliability, and measurement invariance of the School Relatedness Scale and of the School Well-being Scale.

The results showed that the factor structures that were hypothesized for the SRS and SWS fitted the data well. Furthermore, the scales showed reliability in terms of internal consistency: the lowest Cronbach's alpha for the scales was .71.

The MCFA revealed the presence of metric invariance across gender for the SRS and of partial measurement invariance for the SWS. The partial metric invariance of the SWS complied with the conservative criteria proposed by Vandenberg and Lance (2000) because the constraints were relaxed only for a minority of indicators (two items). Therefore, SRS and SWS provide a valid representation of the students' relatedness and school well-being

constructs for both boys and girls.

On the whole the results of the present study indicate that SRS and SWS provide a means by which researchers can examine the levels of students' relatedness and school well-being, in both boys and girls. Assessing students' relatedness and school well-being can be especially important because these elements are significant for students' academic success, social improvement, and personal growth (e.g., Cohen, 2006). The research suggests that some elements in schools, such as teaching strategies, a favourable climate and how students are organised, can positively influence the development of students' relatedness and well-being (e.g., Cohen, 2006) and several interventions have been recently designed in order to develop students' well-being (e.g., MIUR, 2007; World Health Organization, 2013). The SRS and SWS could help to evaluate the efficacy of schools and policy interventions in improving students' relatedness and well-being.

In conclusion however, some limitations in the present study should be pointed out. First of all, the composition of the participating sample (i.e. Italian primary school students) might limit the generalizability of the results: future studies should include students from other school grades and from other countries. Secondly, we did not include in the study an observational measure of students' relationships and well-being: it would be useful to take into consideration in future validation studies also an external criterion based on students behaviour in the classrooms.

References

Anderman, L.H. & Anderman E.M.(1999). Social Predictors of Changes in Students' Achievement Goal Orientations. *Contemporary Educational Psychology, 24*(1), 21-37.

Boekaerts, M. (1993). Being Concerned With Well-Being and With Learning. *Educational Psychologist, 28*(2), 149-167.

Byrne, B.M. (2012). *Structural equation modeling with Mplus.* New York: Routledge.

Byrne, B., Shavelson, R., & Muthen, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin, 105*, 456–466.

Cheung, G.W., & Rensvold, R.B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233-255

Cohen, J. (2006). Social, emotional, ethical, and academic education: Creating a climate for learning, participation in democracy, and well-being. *Harvard Educational Review, 76*(2), 201-237.

Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Diener, E., Lucas R.E., Osihi S. (2005). Subjective well-being. The science of happiness and life satisfaction. In Snyder, C.R., Lopez, S.J. (Eds.), *Handbook of Positive Psychology* (pp. 63 - 71). Oxford: University Press.

Hu, L., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), Structural equation modeling: concepts, issues, and applications. Newbury Park, CA: Sage.

Hu, L.T., & Bentler, P.M. (1999). Cut-off criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

MIUR-Ministry of Education, University, and Research (2007). *Piano nazionale per il benessere dello student* [National plan for the students' well-being]. Rome, Italy: Author.

Muthen, L. K., & Muthen, B. O. (1998-2012). *Mplus User's Guide. Seventh Edition*. Los Angeles, CA: Muthen & Muthen.

Niemiec C.P & Ryan R.M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education ,7*, 133-144

Niemiec C.P, Ryan R.M., Deci E.L. (2009). The path taken: Consequences of attaining intrinsic and extrinsic aspirations in post-college life. *Journal of Research in Personality, 43*, 291–306.

Orkibi, H., Ronen, T., & Assoulin, N. (2013). The Subjective Well-Being of Israeli Adolescents Attending Specialized School Classes. *Journal of Educational Psychology*. 1-13. doi: 10.1037/a0035428

Schreiber, J.B., Nora, A., Stage, F.K., Barlow, E.A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *Journal of Educational Research, 99*, 323-337.

Vandenberg, R.J., & Lance C.E. (2000). A Review and Synthesis of the Measurement Invariance Literature: Suggestions, Practices, and Recommendations for Organizational Research. *Organizational Research Methods, 3*(4), 4-70.

WHO-World Health Organization (2013). *Mental health action plan 2013 – 2020*. Geneva, Switzerland: Author.